Digitizing Marine Corps Medical Records

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Digitizing Marine Corps Medical Records
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The dedicated US Navy corpsmen and medical personnel assigned to Marine Corps units are doing a better job of saving Marines' lives than ever before. Heroic "Devil Docs" risk their lives daily to provide life saving point-of-injury care to Marines – witness the fact that as of 15 December 2005, twelve corpsmen had been killed in action during the Global War on Terrorism (GWOT).[1] Furthermore, a ten percent lethality of wounds rate for the GWOT means that nine in ten Marines wounded by hostile fire will make it to a medical treatment facility capable of providing care to save life, limb, or sight.[2]

Unfortunately, Marine Corps Health Service Support (HSS) units and Navy Medicine in general do not have the capability to capture records of health care administered in deployed settings, merge those patient encounters with each Marine's individual medical record, and track patients evacuated from the battlefield to higher echelons of care. As a result, health care providers at successive levels of care have difficulty determining what treatment a patient received prior to arrival and medical planners have to resort to less than optimal methods to track and trend

[1] Rivera, Tim. "Fallen Heroes Memorial" <http://www.fallenheroesmemorial.com> (15 December 2005).

[2] Paine, George. "Casualties in Iraq" <http://www.warblogging.com/archives/000998.php> (15 December 2005).

medically reportable events in theater. However, failing to reliably capture records of care provided in deployed arenas and merge that data with garrison medical records ultimately harms our own Marines most:

> [The] inability of Marine Corps medicine to provide a comprehensive record of care upon member retirement, medical board, or discharge…[means that] members will present to the Dept. of Veterans Affairs without documentation of illness and injury that may adversely affect their eligibility for care or disability.[3]

However, an existing material solution can fill this gap. Joint software products provided by the Theater Medical Information Program (TMIP) fill the void and have been in wide use by US Army Medical Units since 2003. Unfortunately, in the Marine Corps' case the effort to modernize in-theater health care documentation is well behind schedule owing to funding shortfalls. If the Marine Corps is serious about deploying a comprehensive system to capture digital records of health care provided while deployed, it must increase the level of investment associated with this effort.

[3] United States Marine Corps, I Marine Expeditionary Force. 18 December 2004. *Electronic Medical Data Urgent Universal Need Statement*.

Background

After action assessments of the Gulf War revealed several medical information gaps. Commanders found it difficult to track the status and location of casualties evacuated from the battlefield to higher intra and extra-theater echelons of medical care. Additionally, data regarding medical encounters with patients during the ground war was not preserved for fusion with individual service members' medical records. Consequently, as cases of "Gulf War Illness" arose, health care providers had no empirical data to which they could turn in order to identify potential causes.

Because of numerous Congressional and Presidential mandates directing the Department of Defense (DoD) to implement comprehensive digital medical records for service members and medical tracking systems for deployed forces, the DoD Military Health System established the Theater Medical Information Program (TMIP) acquisition program.[4]

[4] Mandates include the Special Report of the Presidential Advisory Committee on Gulf War Veterans' Illness and Title 10 U.S.C., Subtitle A, PART II, Chapter 55 § 1074f (Medical tracking system for members deployed overseas)

TMIP was chartered to deliver a suite of Joint software capable of collecting, processing, and storing medical information within a theater of operations and supplementing service members' lifelong digital medical records with health care encounters collected while deployed. TMIP was also intended to facilitate the tracking of medically reportable events such as disease/non-battle injuries and to assist commanders in tracking casualties.

TMIP's acquisition strategy hinged on development of a Joint software suite to be fielded by participating service component acquisition programs. Each service program was responsible for integrating the Joint software product with its unique concept of employment, communications architecture, and infrastructure. In short, each service was tasked to deploy a complete medical information technology enabler based on a single Joint software product.[5] The service acquisition programs would pay the costs associated with acquiring the necessary hardware to host the Joint TMIP software suite, integrating that

[5] Theater Medical Information Program Management Office. 24 April 2002. *Theater Medical Information Program (TMIP) Acquisition Strategy*.

hardware and software with existing communications systems, and sustaining the system once fielded.

TMIP Maritime

The Navy and Marine Corps established a joint acquisition program to integrate and field TMIP software to the Naval Medical Community. This program, TMIP-Maritime (TMIP-M), would replace and augment capabilities provided by the legacy Shipboard Automated Medical System (SAMS). This aging software application is used primarily to track individual medical readiness within the Marine Corps.[6]

The Marine Corps meets all fiduciary requirements less Navy personnel costs associated with providing a health service support capability to elements of the Marine Air-Ground Task Force. Accordingly, the Marine Corps agreed to meet costs associated with delivering TMIP to its organic medical elements. Decision makers built a Marine Corps funding profile that envisioned procuring the hardware (computer workstations and hand-held devices) required to host TMIP software applications and little else. Of note,

[6] At time of print, SAMS is not capable of meeting numerous medical surveillance and data aggregation requirements while the current build of TMIP software can.

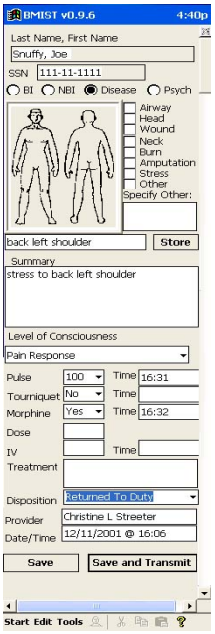
cost drivers associated with new equipment training, system sustainment, as well as system integration and test were not identified.

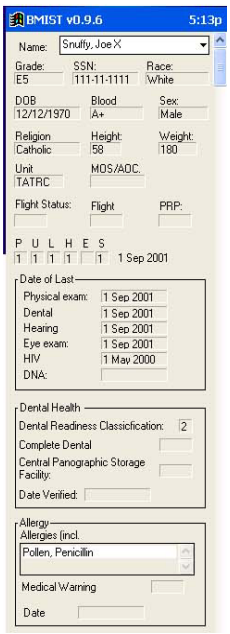
Current Status

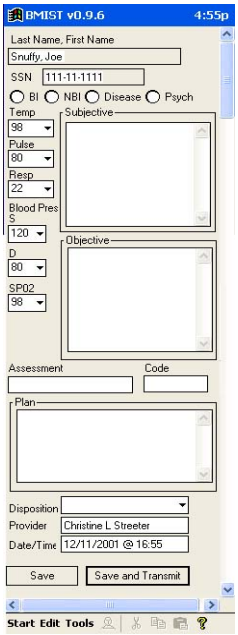
The TMIP Joint program has successfully produced and delivered block one of its medical software suite to its participating service components.[7] The software was first fielded by the Army's Medical Communications for Combat Casualty Care (MC4) program in support of Operation Iraqi Freedom in 2003 and is now in wide use by deployed Army Medical Units. MC4 capability sets include servers, laptop workstations, and handheld (personal digital assistant – PDA) devices loaded with TMIP software applications that enable healthcare providers to digitally document care provided to deployed soldiers. The Battlefield Medical Information System Tactical (BMIS-T) application loaded on PDA form factors similar to the Dismounted Digital Automated Communications Terminal (D-DACT) even allows battlefield medics to document health care in austere field environments.

[7] The term "block" denotes a major release or version of a system. In accordance with the evolutionary or "spiral" development model, successive improved releases of a system are produced in order to mitigate risk.

Handheld Device (PDA) loaded with BMIS-T application (rugged carrying case not shown)







BMIS-T application screen shots

Personal Information Carrier (PIC) – i.e., digital medical "dog tag" used to transfer medical data between echelons of medical care

Source - Telemedicine & Advanced Technology Research Center

In conjunction with Personal Information Carriers (PICs – "digital dog-tags") and Non-Classified Internet Protocol Router Networks (NIPRNETs) MC4 transfers medical encounter data to the Joint Medical Workstation (JMeWs) server located in the Continental United Sates (CONUS). The JMeWs server provides a suite of medical analysis tools via a classified web portal for deployed medical personnel to track individual patients throughout the evacuation chain and track/trend significant medical events. Furthermore, data is fed from JMeWs to the Clinical Data Repository (CDR) database, also located in CONUS. Garrison

medical systems also pass information to the CDR, which makes it the consolidated repository for service members' life-long digital medical records.

Due to a lack of financial resources and war fighter support, TMIP-Maritime is far behind the Army's MC4 program. The Marine Corps component of the program was scheduled to achieve an Initial Operational Capability (IOC – defined as TMIP capability sets fielded to 1 x Marine Expeditionary Force) in FY 03, but has just now reached this benchmark owing to an interim fielding of TMIP systems in support of the GWOT.[8] Following initial system deliveries in May 2005, TMIP capability sets are now in use within Iraq by Marine Corps HSS units and have undergone successful testing at the Marine Corps Tactical Systems Support Activity (MCTSSA) aboard Camp Pendleton.[9]

"TMIP Lite" – interim system fielded to Marine medical units

[8] Chief of Naval Operations; Medical Plans, Policies, and Resources (N931). 11 April 2001. *Operational Requirements Document (ORD) for the Theater Medical Information Program Maritime Component (TMIP-M).*

[9] United States Marine Corps, Marine Corps Systems Command. 18 November 2005. *Quick Look Report for the TMIP-M (USMC) Limited User Test of the Theater Medical Information Program (TMIP) Block 1.*

Urgency

According to Headquarters Marine Corps, the recent interim deployment of TMIP capability sets to Marine Corps HSS units was conducted due to, "… an urgent and compelling need to expedite the delivery of automated medical information management capability for deployable medical units."[10] Deployed units urgently require a system that enables commanders and health care providers to track casualties and to transfer medical information between echelons of care reliably:

> Marine Corps forces in OEF… and OIF II are unable to adequately transfer medical information between places of care. They have… limited review capabilities for tracking/trending…disease and conditions. They are fully non-compliant with the ASD (Health Affairs) mandate to submit electronic data for care delivered for central archiving, review of pre-post deployment health assessments, and preventive medicine…Current medical documentation includes paper (often lost/illegible), no-

[10] Headquarters United States Marine Corps; Director, Health Services. 30 September 2005. *Request for Authorization to Employ Theater Medical Information Program (TMIP) Software Products*.

documentation, and writing on body parts (forehead/limbs) and bandages with an indelible marker.[11]

Without the capabilities provided by TMIP software, there is no capability to feed each Marine's digital medical record with in-theater care data.[12] This means not only that the Marine Corps is unable to generate electronic medical records in accordance with Congressional and Presidential mandates, but also that Marines may encounter difficulties when establishing eligibility for disability based on incomplete records of care and injury.

The Cost

Procuring an end-to-end information technology solution is rarely cheap. Although a software solution in the form of the Joint TMIP suite of applications already exists, the Marine Corps must concern itself with not only hardware procurement costs, but also integration, help desk support, and most significantly training costs. In order to sustain TMIP capability sets that have already been

[11] United States Marine Corps, I Marine Expeditionary Force. 18 December 2004. *Electronic Medical Data Urgent Universal Need Statement*.

[12] Headquarters United States Marine Corps; Director, Health Services. 30 September 2005. *Request for Authorization to Employ Theater Medical Information Program (TMIP) Software Products*.

fielded and ensure that the Marine Corps achieves its Full Operational Capability (FOC) by deploying TMIP systems to each Marine Expeditionary Force (MEF) by FY 07, a shortfall of $11 million must be met. Meeting this financial requirement will ensure that end-users of TMIP in the Marine Corps have adequate new equipment training and post-deployment support for a system that has been thoroughly tested and certified to be “bug free.”

The Marine Corps currently plans to commit $46.8 million (approximately $264 per Marine) toward deploying and supporting TMIP within HSS units of the MAGTF throughout the life of the program. In contrast, the Army has a funding profile of $221.91 million (approximately $462 per soldier) to support its MC4 program.[13,14] Because it will be able to digitally document health care in deployed arenas and ensure soldiers have truly comprehensive medical records, the Army will realize a tremendous return on investment.

[13] Calculations are based on a 480,000-soldier Army active force, a 178,000 strong active duty Marine Corps, and funding profiles of service TMIP acquisition programs in Then-Year (nominal) dollars.

[14] Theater Medical Information Program Management Office. 24 April 2002. *Theater Medical Information Program (TMIP) Acquisition Strategy*.

Some argue that the opportunity cost of TMIP is too high for the Marine Corps. That is, they contend that the Marine Corps' fixed financial resources can never satisfy unlimited requirements and that procuring TMIP capability sets equates to foregoing other more critical capabilities. However, the Marine Corps cannot go on without a system that documents health care provided in theater and seamlessly transfers that data to each Marine's comprehensive medical record while allowing commanders to track the status of casualties evacuated from the battlefield. The Marine Corps must get serious about acquiring an effective, capable medical information technology enabler and meet the shortfalls associated with the TMIP program.

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